Bio efficacy of various plant oils as grain protectants against the pulse beetle, *Callosobruchus maculatus* (Coleoptera: Chrysomelidae)

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ABSTRACT

The pulse beetle, *Callosobruchus maculatus* (Fabricius), is a globally destructive pest of stored legumes, causing immense economic and nutritional losses. In the pursuit of sustainable and environmentally safe pest management strategies, this study evaluated the contact toxicity of nine botanical oils (sunflower, groundnut, mustard, mint, castor, coconut, cottonseed, tobacco seed, and neem 3000 ppm) against adult *C. maculatus*. Bioassays were conducted using oil concentrations ranging from 0.5 to 2.0 ml per 100g of seed, with mortality recorded 24 hours post-treatment. Neem oil demonstrated the highest toxicity, yielding the lowest median lethal concentration (LC50 = 1.25 ml/100g seed) and achieving 67.33% mortality at the highest dose. Mustard, castor, and cottonseed oils also exhibited potent insecticidal properties. In contrast, coconut oil was the least effective (LC50 = 2.00 ml/100g). These findings underscore the potential of botanical oils, particularly neem and mustard, as viable, eco-friendly alternatives to synthetic fumigants in integrated stored-product pest management.

Keywords: *Bioassay, Contact toxicity, Ic50,Mortality and Pulse beetle*